

UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	Examiner: Daniel S. Metzmaier
)	
Marder et al.)	Art Unit: 1712
)	
Serial No.: 09/918,874)	Confirmation No.: 3252
)	
Filed: July 30, 2001)	
)	
For: TWO PHOTON OR HIGHER-)	
ORDER ABSORBING OPTICAL)	
MATERIALS AND METHODS OF USE)	
)	

Mail Stop RCE
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

RESPONSE AND REQUEST FOR INTERVIEW

Dear Sir:

In response to the Office Action mailed July 10, 2008 ("Office Action"), reconsideration is requested in light of the following. An extension of time is requested. As a Notice of Appeal was previously received on January 21, 2009, this response is timely filed.

Amendments to the Claims are reflected in the listing of claims beginning on page 2.

Remarks begin on page 14.

Certificate of Mailing/Transmission (37 C.F.R. § 1.8(a)):

[X] Pursuant to 37 C.F.R. § 1.8, I hereby certify that this paper and all enclosures are being deposited with the United States Postal Service as first class mail on the date indicated below in an envelope addressed as indicated herein.

[] I hereby certify that this paper and all enclosures are being sent via facsimile in accordance with 37 C.F.R. § 1.6(d) on the date indicated below to Facsimile No. _____ at ____ a.m./p.m.

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Dated: July 21, 2009

Signature of Person Certifying: /David W. Maher/
Printed Name: David W. Maher

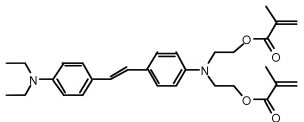
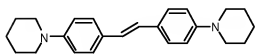
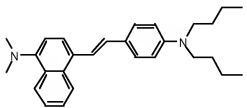
Listing of Claims:

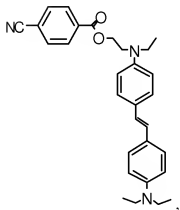
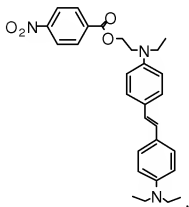
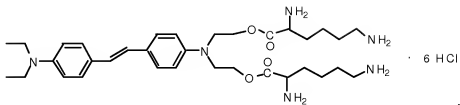
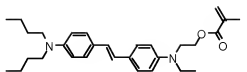
1-2. (Cancelled)

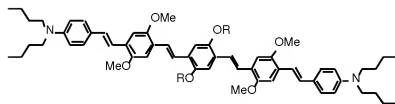
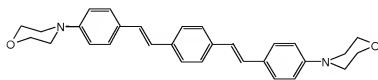
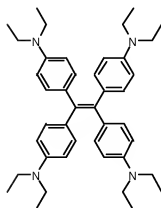
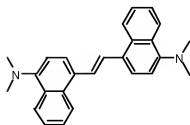
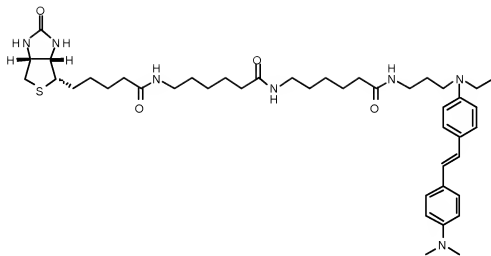
3. (Previously presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

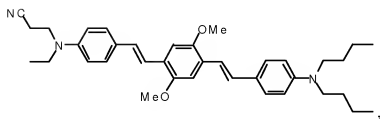
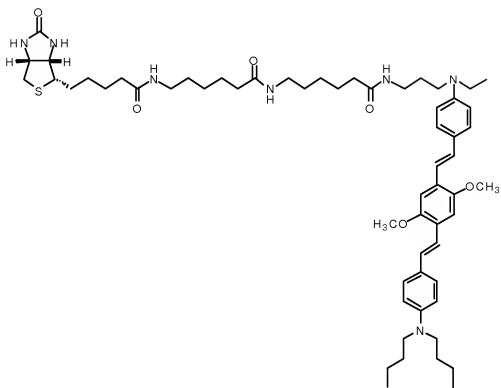
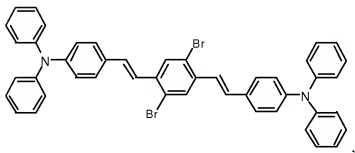
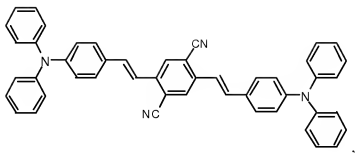
a) exposing a compound having the formula D_1 - Π - D_2 to radiation, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π -conjugated bonds connecting D_1 and D_2 ; and

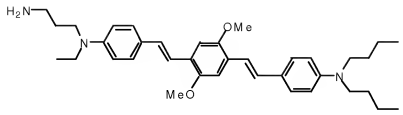
b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is selected from the group consisting of









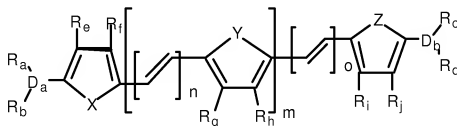


and mixtures thereof, where $R=(CH_2)_{11}CH_3$.

4-15. (Cancelled)

16. (Previously Presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

- a) exposing a compound having the formula $D_1\text{-}\Pi\text{-}D_2$ to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π -conjugated bonds connecting D_1 and D_2 ; and
- b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m , n , o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $\text{CR}_k=\text{CR}_l$, O, S, and N-R_m;

R_a, R_b, R_c, R_d are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{OR}_{a1}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{NR}_{a2}\text{R}_{a3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{CONR}_{a2}\text{R}_{a3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{CN}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{Cl}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{Br}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{I}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta$ -Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic ring framework, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-\text{CH}_2)_\delta\text{SiCl}_3$, $(-\text{CH}_2)_\delta\text{Si}(\text{OCH}_2\text{CH}_3)_3$, and $(-\text{CH}_2)_\delta\text{Si}(\text{OCH}_3)_3$, where $0 < \delta < 25$;

wherein one of R_a and R_b is not present when D_a is O or S, and wherein one of R_c and R_d is not present when D_b is O or S;

R_e, R_f, R_g, R_h, R_i, R_j, R_k, R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{OR}_{b1}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{NR}_{b2}\text{R}_{b3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{CONR}_{b2}\text{R}_{b3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{CN}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{Cl}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{Br}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta\text{I}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha(\text{CH}_2)_\beta$ -Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO₂, Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, NR_{e1}R_{e2}, and OR_{e3};

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1}, R_{b2}, and R_{b3} are each independently a functional group obtained by reaction with:

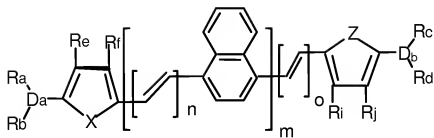
an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{e1} , R_{e2} , R_{e3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$ -Phenyl, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $-(CH_2)_\delta SiCl_3$, $-(CH_2)_\delta Si(OCH_2CH_3)_3$, and $-(CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

R_{g1} , R_{g2} , and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:
an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.

17. (Previously Presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

- a) exposing a compound having the formula $D_1-\Pi-D_2$ to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π -conjugated bonds connecting D_1 and D_2 ; and
- b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m , n , o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $CR_k=CR_l$, O, S, and N- R_m ;

R_a , R_b , R_c , R_d are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$ -Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic ring framework, fused aromatic rings, vinyl, allyl, 4-styryl, acrolyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

wherein one of R_a and R_b is not present when D_a is O or S, and wherein one of R_c and R_d is not present when D_b is O or S;

R_e , R_f , R_i , R_j , R_k , R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$ -Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO_2 , Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, $NR_{e1}R_{e2}$, and OR_{e3} ;

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1} , R_{a2} , and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1} , R_{b2} , and R_{b3} are each independently a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{e1} , R_{e2} , R_{e3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{g1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{g2}R_{g3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$ -Phenyl, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acryloyl, methacryloyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $-(CH_2)_\delta SiCl_3$, $-(CH_2)_\delta Si(OCH_2CH_3)_3$, and $-(CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

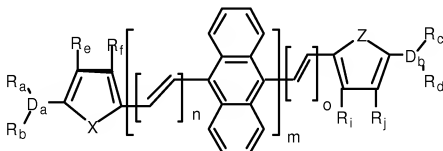
R_{g1} , R_{g2} , and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.

18. (Previously Presented) A method for preparing a compound in an electronically excited state, comprising the steps of:

- a) exposing a compound having the formula $D_1-\Pi-D_2$ to radiation of a wavelength within a multiphoton absorption peak of said compound, wherein D_1 and D_2 are electron donor groups; and Π comprises a bridge of π -conjugated bonds connecting D_1 and D_2 ; and
- b) converting said compound to a multi-photon electronically excited state upon simultaneous absorption of at least two photons of said radiation by said compound, wherein the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state and wherein the

energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state, wherein said compound is further defined by a formula



where D_a is selected from the group consisting of N, O, S, and P;

where D_b is selected from the group consisting of N, O, S, and P;

m , n , o are integers such that $0 \leq m \leq 10$, $0 \leq n \leq 10$, and $0 \leq o \leq 10$; and

where:

X, Y, Z are independently selected from the group consisting of $CR_k=CR_l$, O, S, and N- R_m ;

R_a , R_b , R_c , R_d are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{a1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{a2}R_{a3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Cl$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta Br$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta I$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta$ -Phenyl, a group of aromatic rings having up to 20 carbons in the aromatic ring framework, fused aromatic rings, vinyl, allyl, 4-styryl, acryloyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins, $(-CH_2)_\delta SiCl_3$, $(-CH_2)_\delta Si(OCH_2CH_3)_3$, and $(-CH_2)_\delta Si(OCH_3)_3$, where $0 < \delta < 25$;

wherein one of R_a and R_b is not present when D_a is O or S, and wherein one of R_c and R_d is not present when D_b is O or S;

R_e , R_f , R_i , R_j , R_k , R_l and R_m are independently selected from the group consisting of, H, a linear or branched alkyl group with up to 25 carbons, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta OR_{b1}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta NR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CONR_{b2}R_{b3}$, $-(CH_2CH_2O)_\alpha-(CH_2)_\beta CN$,

$-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{Cl}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{Br}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{I}$,
 $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{-Phenyl}$, a group of aromatic rings having up to 20 carbons in the aromatic framework, fused aromatic rings, CHO, CN, NO₂, Br, Cl, I, phenyl, an acceptor group containing more than two carbon atoms, a functional group obtained by reaction with an amino acid, NR_{e1}Re₂, and OR_{e3};

where $0 < \alpha < 10$ and $1 < \beta < 25$;

R_{a1}, R_{a2}, and R_{a3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

R_{b1}, R_{b2}, and R_{b3} are each independently a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride;

Re₁, Re₂, Re₃ are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{OR}_{g1}$,

$-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{NR}_{g2}\text{R}_{g3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{CONR}_{g2}\text{R}_{g3}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{CN}$,

$-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{Cl}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{Br}$, $-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{I}$,

$-(\text{CH}_2\text{CH}_2\text{O})_\alpha-(\text{CH}_2)_\beta\text{-Phenyl}$, aryl groups, fused aromatic rings, vinyl, allyl, 4-styryl, acroyl, methacroyl, acrylonitrile, isocyanate, isothiocyanate, epoxides, strained ring olefins,

$(-\text{CH}_2)_\delta\text{SiCl}_3$, $(-\text{CH}_2)_\delta\text{Si}(\text{OCH}_2\text{CH}_3)_3$, and $(-\text{CH}_2)_\delta\text{Si}(\text{OCH}_3)_3$, where $0 < \delta < 25$;

R_{g1}, R_{g2}, and R_{g3} are independently selected from the group consisting of H, a linear or branched alkyl group with up to 25 carbons, and a functional group obtained by reaction with:

an amino acid, a polypeptide, adenine, guanine, tyrosine, cytosine, uracil, biotin, ferrocene, ruthenocene, cyanuric chloride, or methacryloyl chloride.

19. (New) The method of claim 16, wherein m is 1-10.

20. (New) The method of claim 17, wherein m is 1-10.

21. (New) The method of claim 18, wherein m is 1-10.

REMARKS

In the Office Action: claim 3 was allowed; claims 16-18 were rejected under 35 USC § 112, second paragraph; claims 16-18 were rejected under 35 USC § 102(b) over J. Phys. Chem. 1993, 97, pp. 9385-9389 (“Puccetti”); claims 16-18 were rejected under USC § 103(a) over USPN 4,333,165 (“Swainson”) in view of Minolta Camera Co Ltd, JP 62-010652 (“Minolta”) ; and claims 16-18 were rejected under USC § 103(a) over Swainson in view of Konishiroku Photo Ind Co Ltd, JP 62-047646 (“Konishiroku”). These rejections are traversed.

Applicants thank the Examiner for the withdrawal of the rejection of claim 16 under 35 USC § 102(b) over JP 02-187734A (“Sekisui”).

New claims 19-21 are added. Support is found throughout the application as filed, including without limitation Figures 2 and 10-12, Tables 2-5, and the examples, including Examples 15, 49 and 60. No new matter is added.

All amendments are made without prejudice or disclaimer. All previous arguments are herein incorporated by reference, and supplemented by the material provided here.

Request for Interview

Applicants formally request a telephonic or formal interview prior to examination. The undersigned may be reached at (858) 228-7829.

The Rejections Under 35 USC § 112, Second Paragraph

Claim 16-18 were rejected under 35 USC § 112, second paragraph, on the grounds that certain terms allegedly rendered the claims indefinite. These rejections are traversed.

Definiteness and Distinct Claiming Under 35 USC § 112, Second Paragraph

"The requirement to 'distinctly' claim means that the claim must have a meaning discernible to one of ordinary skill in the art when construed according to correct principles. Only when a claim remains insolubly ambiguous without a discernible meaning after all reasonable attempts at construction must a court declare it indefinite." *Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1366, 71 USPQ2d 1081, 1089 (Fed. Cir. 2004).

As set forth in MPEP 2173.02, a claim term is definite if its meaning is discernible. *Bancorp Services, L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1372, 69 USPQ2d 1996, 1999-2000 (Fed. Cir. 2004).

Only if a claim term is insolubly ambiguous after all reasonable efforts at construction can it be declared indefinite.

Amino Acid. Each of Re-m, R_{a1-a3}, R_{b1-b3} and R_{g1-g3} were said to be "unclear what an amino acid is reacted to form said functional group." Office Action, page 3, first paragraph. This rejection is traversed.

One of Skill in Art Can Discern the Meaning of the Claim Term. As set forth in the accompanying declaration, a person of skill in the art, following the teachings of the application and the knowledge in the art, can discern what an amino acid is and how to react an amino acid to add a new functional group to the chromophores recited in the claims.

The accompanying declaration establishes that, upon review of the support in the application, including the description and the examples, a person of skill in the art finds that the meaning of the language used in the claims ("a functional group obtained by reaction with an amino acid") can be discerned.

Numerous Functional Groups Incorporated into the Chromophores Can Be Used for Derivatization. The application describes numerous examples of functional groups that can be incorporated into the chromophores and reacted with amino acids and other molecules to introduce new functionalities into the chromophores. See pages 18-19. These include, without limitation, amines, hydroxyls, carboxylic acids, acyl chlorides, cyano groups, aldehydes, and

sugars. Examples are provided for attachment of hydroxyls (example 5, 16, 18, 19, 20, 25), amines (example 45), amide linkage (Column 57, example 46), and aldehydes (column 74, example 68), and ester formation through reaction of a hydroxyl with an amino acid (examples 35-38).

Grounds of Rejection Not Clearly Stated. It is respectfully submitted that the grounds of rejection on this point are not clearly stated. As set forth at MPEP 706.02(i) and 707.07(d):

It is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply.

It cannot be determined from the grounds stated in the Office Action what is being objected to. The language recited in the rejection does not track the language of the claim. Applicants have previously asked for clarification, which has not been provided. Does the Examiner propose that a person of skill in the art does not know what an amino acid is, or does not know how to react an amino acid to add a new functional group to the chromophores recited in the claims?

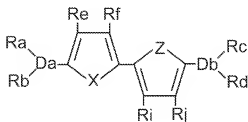
No Admissible Evidence Has Been Provided That The Claim Term Is Indefinite. No evidence is of record that a person of skill in the art cannot discern the meaning of the claim terms, nor has any attempt to construe the claim language been made. As no evidence contradicts the undisputed declaration provided herewith, the rejection is unsupported.

Conclusion. Because the meaning of the term can be discerned by one of skill in the art, this term is definite. No evidence has been provided to the contrary. Abundant support is provided in the application for the claim term. Withdrawal of this rejection is respectfully requested.

The Pi Bridge. Claims 16-18 were rejected as allegedly indefinite where m and o were zero, as the examiner could not locate a pi bridge in that case. This rejection is traversed.

As set forth previously, a pi bridge exists in the terminal ring structures (the "X"- and "Z"-containing rings) when m and o are zero. The conjugated system formed by the unsaturated bonds in these rings constitute a pi bridge. When m and o are simultaneously zero, the structures

of the three claims are identical (see below), and consist of the donor groups (Da and Db) and pi-bridges:



The pi-bridges consist of the unsaturated conjugated bonds in the “X” and “Z” rings linking the donor groups Da and Db.

One of Skill in Art Can Discern the Meaning of the Claim Term. As set forth in the accompanying declaration, a person of skill in the art, following the teachings of the application and the knowledge in the art, can discern where the pi bridge is when m and n are zero.

The accompanying declaration establishes that, upon review of the support in the application, including the description and the examples, a person of skill in the art finds that the pi bridge is located as set forth above.

No Admissible Evidence Has Been Provided That The Pi Bridge Is Indefinite. No evidence is of record that a person of skill in the art cannot discern where the pi bridge is located when m and n are zero.

As the meaning of the claim terms can be discerned by one of skill in the art, these terms are definite. Withdrawal of these rejections is respectfully requested.

The Cited Art Rejections

Claims 16-18 were rejected under 35 USC §102(b) over Puccetti (J. Phys. Chem. 1993, 97, pp. 9385-9389); and claims 16-18 were rejected under 35 USC §103(a) over Swainson in view of either Minolta or Konishiroku. These rejections are traversed. The art cited in the Office Action does not teach or suggest the invention as claimed. Applicants’ prior arguments

regarding the lack of foundation of inherent anticipation and obviousness are hereby incorporated by reference. Additional arguments are presented below.

The Examiner Has Not Met His Burden to Establish Inherent Anticipation. Anticipation requires that all claim elements be present in a single reference. Anticipation by inherency requires that each claim element not explicitly taught must necessarily be present in that reference. The Patent Office bears the burden of showing that an allegedly inherent property is necessarily present in the cited reference (MPEP 2112):

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (overturning inherency rejection unsupported by factual basis or cogent scientific reasoning; citations omitted, emphasis in original).

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

As has been acknowledged, Puccetti does not discuss multiphoton absorption. Therefore the Office Action relies on an inherency theory to assert that Puccetti inherently met the claim limitations. The examiner must provide a basis in fact and/or technical reasoning as to why Puccetti necessarily teaches each element of claims 16-18. This has not been done.

Harmonic Generation Does Not Involve Absorption or Relaxation. The Office Action has incorrectly asserted that "irradiation with said laser produces a second or third harmonic generation, thereby resulting in relaxation ..." and that this "is evidence that at least some simultaneous multi-photon absorption occurs in the process" as a basis for its rejections. Office

Action, page 5. This is scientifically baseless and incorrect. No absorption or relaxation occurs in harmonic generation. Therefore no basis in fact or technical reasoning has been provided as to why multiphoton absorption actually occurred in Puccetti's experiments.

Puccetti Teaches Their Materials Are Transparent at the Wavelengths Used. As discussed during the interview, Puccetti teaches that his compounds are *transparent* at the wavelengths employed. See page 9388, right column (the harmonic wavelength ... is located within the transparency range of the molecules). Thus the molecules used by Puccetti do not absorb at $\frac{1}{2}$ or $\frac{1}{3}$ the wavelength of the incident light; Puccetti chose wavelengths to specifically avoid any absorption. Evidence of record indicates this strategy is known in the art. No evidence of record contradicts this.

Evidence of Record Indicates Puccetti Utilizes Incident Light Over 600 nm From a Multiphoton Absorption Peak. Appendix A submitted with the response filed March 10, 2008 demonstrated sound scientific reasons that the compounds of Puccetti should have multi-photon absorption peaks over 600 nm removed from the incident light used by Puccetti. Applicants demonstrated that compounds of similar structure to Puccetti's have peak two-photon absorptions within the range of 600-700 nm (see Table 1 at page 9504). Puccetti, by contrast, irradiated his molecules with incident light of 1340 nm, over 600 nm removed. This evidence has not been disputed.

The Office Action's Assertions that Different Wavelengths Can Be Used For Irradiation Contradicts Inherency Based on Absorption from a Coherent Laser. The Office Action has stated, in response to Applicants' arguments and scientific evidence that the incident light used in Puccetti is far removed from a multiphoton absorption peak, that the "wavelengths of the

multiple photons are not required to be the same.” This is completely inconsistent with the asserted inherency argument, as a coherent laser is used as the light source in Puccetti. As only one wavelength is used for irradiation, multiple wavelengths were never used by Puccetti.

The Office Action Incorrectly States the Claims Lack Limits Regarding Wavelength and Result. The Office Action incorrectly states that the claims lack limitations regarding the wavelength or the result of multi-photon absorption, or of the degree or amount of multi-photon absorption.

The claims recite the following limitations in these regards:

- a) that the incident light is of a wavelength within a multiphoton absorption peak of said compound;
- b) that the sum of the energies of all of said absorbed photons is greater than or equal to the transition energy from a ground state of said compound to said multi-photon excited state;
- c) the energy of each absorbed photon is less than the transition energy between said ground state and the lowest single-photon excited state of said compound and is less than the transition energy between said multi-photon excited state and said ground state; and
- d) the result that the compound is converted to a multi-photon electronically excited state.

Therefore this stated grounds is without support.

Thus, there is no basis for inherent anticipation by Puccetti of claims 16-18. No basis in fact and/or technical reasoning has been provided as to why Puccetti necessarily teaches multiphoton absorption, much less within a multiphoton absorption peak of the molecule. Furthermore, the Office Action contradicts the stated basis for inherent anticipation by asserting multiple wavelengths are needed to meet the claim limitations. Withdrawal of this rejection is respectfully requested.

Minolta and Konishiroku do not teach or suggest optically active molecules

The obviousness rejections of claims 16-18 over Swainson in view of either Minolta or Konishiroku are traversed. Contrary to the assertions in the Office Action, neither Minolta nor Konishiroku teach or suggest a compound falling within the claim scope that is optically active. Both references teach the use of the cited compounds as charge carriers in photoreceptors that contain a separate optically active material. Charge carriers/transport agents as described in Minolta and Konishiroku carry a charge generated by a separate optically active material in optoelectronic devices. Charge carriers in such devices are not optically active.

Swainson alone describes the use of two-photon absorption systems. Such systems were not new, and in fact, the background of the invention describes such systems from 1931. Swainson thus does nothing to teach or suggest the invention as claimed.

Minolta was said to “disclose photosensitive materials formed of photosensitive compounds and may further include sensitizing dyes.” Office Action, page 6, last paragraph. However, Minolta does not describe their compounds as the photosensitive materials.

Minolta describes cited compounds 5, 16 and 18 as charge transfer agents (see title) in a photoreceptor. The photoreceptor preferably “comprises a charge generation layer and [a separate] charge transport layer containing the butadiene compound.” See page 2 of Derwent abstract. The actual photoactive charge generation compound was said to be an organic compound such as bisazo pigments, thiazine series pigments or cyanine series dyes (etc.), i.e., commonly known optically active materials. Thus, the butadiene molecules in Minolta were not the optically active species, and in fact were being used as charge carriers.

Similarly, Konishiroku was cited as disclosing compounds 7 and 16 as photosensitive materials formed of photosensitive compounds. Konishiroku was said to teach an optically active material. However, compounds 7 and 16 were used as carrier transporting substances in Konishiroku, not as optically active species (see title and first sentence of abstract). The carrier transporting substance is used in combination with a carrier generating substance (i.e., optically active material) in a photoreceptor. See abstract, first paragraph.

Thus, neither Minolta nor Konishiroku teaches or suggests an optically active molecule falling within the structures of the claims. The argument in the Office Action based on the assertions that these are optically active species that would have been obvious to substitute with Swainson is therefore baseless, as no optical activity of the molecules had been established. And as Swainson does not employ charge transport layers, there was no reason to combine the molecules of Minolta or Konishiroku with Swainson's methods.

Furthermore, optical activity of the cited compounds as actually used in the devices of Minolta and Konishiroku would disrupt their ability to carry charge, and thus would be contrary to their principle of operation. The references are thus not combinable.

Furthermore, nothing in Minolta or Konishiroku teaches or suggests the molecules recited in the methods of claims 19-21.

As there is no teaching, suggestion or motivation to use the charge-transporting molecules of the photoreceptors of Minolta and Konishiroku in the methods of Swainson, obviousness has not been established. Such combination would be contrary to the principles of operation of Minolta and Konishiroku. Withdrawal of the rejection is respectfully requested.

CONCLUSION

As the claims are believed in order for allowance, a notice to that effect is respectfully requested. An interview is formally requested upon entry of the accompanying Request for Continued Examination. The undersigned may be reached at (858) 228-7829.

Respectfully submitted,

/David W. Maher/
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